EPA Region 7 TMDL Review

TMDL ID: MO-875 **State:** MO
Document Name: LAKE CREEK

Basin(s): LAMINE
HUC(s): 10300103
Water body(ies): LAKE CR.
Tributary(ies):
Pollutant(s): SEDIMENT, TOTAL SUSPENDED SOLIDS

Submittal Date: 5/14/2008 **Approved:** Yes

Submittal Letter

State submittal letter indicates final Total Maximum Daily Load(s) (TMDL) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act [40 CFR § 130.7(c)(1)]. Include date submitted letter was received by EPA, date of receipt of any revisions, and the date of original approval if submittal is a phase II TMDL.

The TMDL for Lake Creek was formally submitted by the Missouri Department of Natural Resources (MDNR) in a letter received by U.S. Environmental Protection Agency (EPA), Region 7, on May 14, 2008. The revised version was submitted by email attachment on June 17, 2008.

Water Quality Standards Attainment

The water body's loading capacity (LC) for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards (WQS) [40 CFR § 130.7(c)(1)]. A statement that WQS will be attained is made.

When the WQS is expressed as a narrative value, a measurable indicator of the pollutant may be selected to express the narrative as a numeric value. There are many quantitative indicators of sediment, such as, total suspended solids (TSS), turbidity, and bedload sediment, which are appropriate to describe sediment in rivers and streams. TSS was selected as the numeric target for this TMDL because it enables the use of the highest quality data available, including permit conditions and monitoring data.

In cases where pollutant data for the impaired stream is not available a reference approach is used. The target for pollutant loading at the 25th percentile is calculated from all data available within the ecological drainage unit (EDU) in which the waterbody is located. From this synthetic record, a flow duration is developed from which to build a load duration curve (LDC) for the pollutant within the EDU. The LC is defined by a LDC set at the 25th percentile of current sediment loading in the EDU. The TMDL should result in WQS attainment.

In this TMDL, load allocation (LA) + waste load allocation (WLA) + margin of safety (MOS) (implicit) = TMDL. The load allocation (LC) will be based on the stream flow and the LA is set at 0 .093 tons/day.

All available data for Lake Creek indicates the TMDL is being met. This is conservative evidence that the TMDL will be protective of the designated beneficial uses and therefore an implicit MOS is assigned to this TMDL.

Numeric Target(s)

Submittal describes applicable WQS, including beneficial uses, applicable numeric and/or narrative criteria. If

the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

The impairment of this waterbody is based on exceedance of the general, or narrative, criteria contained in Missouri's WQS, 10 CSR 20-7.031(3)(A), (C) and (G).

(A) Water shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;
(C) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;
(G) Waters shall be free from physical, chemical, or hydrologic changes that would impair the natural biological community.

Lake Creek has the following beneficial uses found at 10 CSR20-7.031(1)(C) and (F) and Table H: Livestock and Wildlife Watering, Protection of Warm Water Aquatic Life, Human Health associated with Fish Consumption, Whole Body Contact Recreation (Category B), and Cool Water Fishery.

The LC is defined by a LDC set at the 25th percentile of the current sediment loading in the EDU. In this TMDL, LA + WLA + MOS (implicit) = TMDL. The LA is set at 0.093 tons/day.

Since the 303(d) listing, MDNR has developed a sediment protocol to determine if sediment is actually the pollutant in the streams listed and to arrive at a standard way to measure sediment. The first step of that protocol is a biological assessment to see if the biological community is actually impaired. However, a biological assessment is not yet available for Lake Creek.

Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety (MOS) that do not exceed the LC. If submittal is a phase II TMDL there are refined relationships linking the load to WQS attainment. If there is an increase in the TMDL there is a refined relationship specified to validate the increase in TMDL (either load allocation (LA) or waste load allocation (WLA)). This section will compare and validate the change in targeted load between the versions.

In cases where pollutant data for the impaired stream is not available a reference approach is used. A reference LDC was developed using the EDU to link daily loads with the narrative sediment criteria. The target for TSS is set at the 25th percentile calculated from all data available within the EDU in which the waterbody is located. Flow records were not available, so a synthetic flow was developed.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, nonpoint and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered. If this is a phase II TMDL any new sources or removed sources will be specified and explained.

The major problems are excessive rates of sediment deposition due to stream bank erosion and sheet erosion from agricultural lands, loss of stream length and loss of stream channel heterogeneity due to channelization, and changes in basin hydrology that have increased flood flows and prolonged low flow conditions. The primary cause of the sediment impairment to Lake Creek has been identified as pollution caused by agricultural nonpoint sources.

Two concentrated animal feeding operations (CAFO)-permitted facilities are located within the watershed. All of these facilities are non-discharging, which do not contribute significantly to sediment loading in Lake Creek. Such systems are designed for the 25-year, 24-hour rainfall/runoff event. Total permitted animal units (AU) for each facility is approximately 996 AU. The actual number of AU on site is variable, but typically less than potential numbers.

Facility - CAFOs	Permit Number	County	Design Flow
Jantz, Gary	MO-G010046	Pettis	Non-discharging
Koehn, Victor & Audra	MO-G010246	Benton	Non-discharging

The submittal demonstrates that all known significant sources have been considered.

Allocation - Loading Capacity

Submittal identifies appropriate WLA for point, and load allocations for nonpoint sources. If no point sources are present the WLA is stated as zero. If no nonpoint sources are present, the LA is stated as zero [40 CFR § 130.2 (i)]. If this is a phase II TMDL the change in LC will be documented in this section.

The LC is defined by a LDC set at the 25th percentile of the sediment concentration in the EDU. All available data for Lake Creek indicates the TMDL is being met. This is conservative evidence that the TMDL will be protective of the designated beneficial uses.

WLA Comment

Submittal lists individual WLAs for each identified point source [40 CFR § 130.2(h)]. If a WLA is not assigned it must be shown that the discharge does not cause or contribute to WQS excursions, the source is contained in a general permit addressed by the TMDL, or extenuating circumstances exist which prevent assignment of individual WLAs. Any such exceptions must be explained to a satisfactory degree. If a WLA of zero is assigned to any facility it must be stated as such [40 CFR § 130.2(i)]. If this is a phase II TMDL any differences in phase I and phase II WLAs will be documented in this section.

All CAFO-permitted livestock facilities in the Lake Creek watershed are non-discharging permits. The WLAs are set at zero. There are no other point sources or storm water sources located in the Lake Creek Watershed.

LA Comment

Includes all nonpoint sources loads, natural background, and potential for future growth. If no nonpoint sources are identified the LA must be given as zero [40 CFR § 130.2(g)]. If this is a phase II TMDL any differences in phase I and phase II LAs will be documented in this section.

The modeling of Lake Creek shows no exceedance of the TMDL curve. The TMDL curve is set at an estimate of expected reference conditions over the range of flows. The LA for Lake Creek is the TMDL minus the WLA, over the range of flows. In this TMDL, load allocation (LA) + waste load allocation (WLA) + margin of safety (MOS) (implicit) =TMDL. The LA is set at 0.093 tons/day.

Margin of Safety

Submittal describes explicit and/or implicit MOS for each pollutant [40 CFR § 130.7(c)(1)]. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided. If this is a phase II TMDL any differences in MOS will be documented in this section.

All available data for Lake Creek indicates the TMDL is being met. This is conservative evidence that the TMDL will be protective of the designated beneficial uses and therefore an implicit MOS is assigned to this TMDL.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s) [40 CFR § 130.7(c)(1)]. Critical conditions are factors such as flow or temperature which may lead to the excursion of WQS. If this is a phase II TMDL any differences in conditions will be documented in this section.

The TMDL curve represents flow under all seasonal conditions. The LA and TMDL are applicable to all flow conditions, hence all seasons. The advantage of the LDC approach is to avoid the constraints associated with

using a single-flow critical condition during the development of a TMDL. Therefore, all flow conditions are taken into account for TMDL calculations.

Public Participation

Submittal describes required public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s) [40 CFR § 130.7(c)(1)(ii)].

EPA regulations require that TMDLs be subject to public review (40 CFR 130.7). As stated earlier, this water quality limited segment of Lake Creek in Pettis, Morgan and Benton counties is included on the EPA approved 1998 and 2002 303(d) lists for Missouri. EPA and the MDNR's Water Protection Program developed this TMDL. The public notice period was from March 26 to April 25, 2008. Groups that received the public notice announcement included the Missouri Clean Water Commission, the Missouri Water Quality Coordinating Committee, the affected facilities, 18 Stream Team Volunteers in the area, and the three state legislators representing Pettis, Morgan, and Benton counties. MDNR posted the notice, the Sediment TMDL Information Sheet and this document on the department Web site, making them available to anyone with access to the Web. No comments were received.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used) [40 CFR § 130.7].

Although the available data show no exceedances of the TMDL curve, a bioassessment study of Lake Creek is scheduled for 2008. This will demonstrate whether the biological community is impaired or not. In addition, the department will routinely examine physical habitat, water quality, invertebrate community and fish community data collected by the Missouri Department of Conservation under its Resource Assessment and Monitoring (RAM) Program. This program randomly samples streams across Missouri on a five to six year rotating schedule.

Reasonable Assurance

Reasonable assurance only applies when less stringent WLAs are assigned based on the assumption of nonpoint source reductions in the LA will be met [40 CFR § 130.2(i)]. This section can also contain statements made by the state concerning the state's authority to control pollutant loads.

Reasonable assurances are not required. There are no point sources for this TMDL and the WLA is set at zero.